



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,049	12/03/2004	Yasushi Kurata	043062	4277

38834 7590 09/10/2007
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER

GOUDREAU, GEORGE A

ART UNIT	PAPER NUMBER
----------	--------------

1763


MAIL DATE	DELIVERY MODE
-----------	---------------

09/10/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/517,049	Applicant(s) KURATA ET AL.	
	Examiner George A. Goudreau	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on (10-3-04' to 12-3-04').
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

George A. Goudreau
GEORGE GOUDREAU
PRIMARY EXAMINER
6-071

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1763

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et. al. (6,447,371).

Kaufman et. al. disclose a two step process for cmp polishing a Cu/Ta/TaN damascene structure which is comprised of the following steps:

-First, the Cu layer is selectively cmp polished down to the barrier layers (i.e.-the Ta/TaN layers).; and

-Second, the Ta/TaN barrier layers are selectively cmp polished to the Cu layer, and the ILD layer which contains the Cu damascene. The second cmp process employs a cmp slurry, which is comprised of the following components:

-H₂O;

- an oxidant (i.e.-H₂O₂, etc.);
- an anticorrosive agent (i.e.-BTA, etc.);
- abrasive particules (i.e.-alumina, etc.) ;
- a complexing agent (i.e.-lactic acid, succinic acid, etc.);
- a surfactant (i.e.-a water soluble polymer); and
- a pH-adjusting agent (i.e.-pH=(4-9))

This is discussed specifically in columns 7-11; and discussed in general in columns 1-16. Kaufman et. al. fail, however, to disclose the following aspects of applicant's claimed invention:

- the specific usage of PVA as the surfactant;
- the specific cmp polishing parameters, which are claimed by the applicant; and
- the specific dented, and projected portions in the surface of the ILD layer which are claimed by the applicant

It would have been inherent that the surface of the ILD layer in the process, which is taught above, is comprised of dented, and projected portion such as those, which are claimed by the applicant based upon the following. No physical surface is truly smooth. Rather, any physical surface is comprised of hills, and valleys (i.e.-dents, and projections). The examiner cites the case law listed below of interest to the applicant in this regard.

In re Swinehart (169 U.S.P.Q. 226 (CCPA)) and In re Best (195 U.S.P.Q. 430 (CCPA)) state that when an examiner has reasonable basis for believing that functional characteristics asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be inherent characteristics of the prior art, the examiner possesses the authority to require an applicant to prove that the subject matter shown to be in the prior art does not possess the characteristics relied upon.

It would have been obvious to one skilled in the art to employ PVA (i.e.-polyvinyl alcohol) as the surfactant in the cmp polishing process taught above based upon the following. The usage of PVA as a surfactant in a cmp slurry is conventional or at least well known in the cmp polishing arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for conducting the cmp polishing process, which is taught above to the specific means, which are taught above.

It would have been prima facie obvious to employ any of a variety of different cmp polishing process parameters in the cmp polishing process taught above including those which are specifically claimed by the applicant. These are all well-known variables in the cmp polishing art, which are known to effect both the rate and the quality of the cmp polishing process. Further, the selection of particular values for these variables would not necessitate any undo experimentation, which would have been indicative of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific process parameters which claimed by the applicant in the cmp polishing process which is taught above based upon *In re Aller* as cited below.

Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific process parameters, which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the cmp polishing process.

Art Unit: 1763

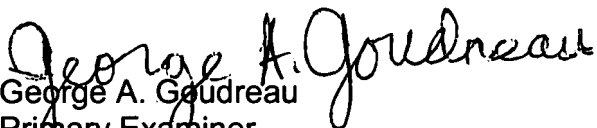
4. Claims 12-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-The wording used throughout claim 12 is written in a very confusing manner, and should be reworded. (i.e.-This is especially true when applicant refers to the dented portions, and the projected portions.)

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6. Any inquiry concerning this communication should be directed to examiner

George A. Goudreau at telephone number (571)-272-1434.


George A. Goudreau
Primary Examiner
Art Unit 1763